OPERATING INSTRUCTIONS

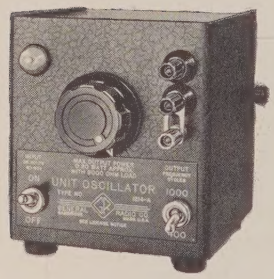
TYPES 1214-A, -D, -E, AND -M UNIT OSCILLATORS

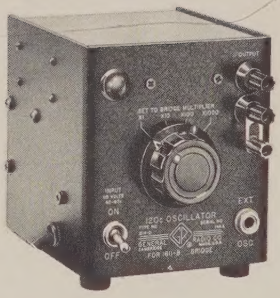
. . . . SINCE 1915
manufacturers of
electronic apparatus
for science and industry

RETURN TO
AEROSPACE DIV.

GENERAL RADIO COMPANY
CAMBRIDGE 39, MASSACHUSETTS, USA

1-E
ly, 1958





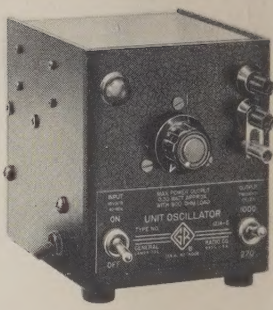


Figure 1.
(Above, left to right) Types 1214-A, 1214-D, and 1214-E Unit Oscillators. (Left) Type 1214-M Unit Oscillator.

SPECIFICATIONS

	1214-A	1214-D	1214-E	1214-M
FREQUENCY	400, 1000 cps	120 cps	270, 1000 cps	1 Mc
ACCURACY	±2%	±2%	±2%	±1%
MAX OUTPUT	200 mw into 8000Ω	200 mw into matched load	300 mv into 800Ω	300 mw into 50Ω
OPEN-CIRCUIT OUTPUT VOLTAGE	60 v	60 v	28 v	7
DISTORTION	3% into 8000Ω	3% into matched load	3% into 800Ω	3.5% into 50Ω
POWER INPUT	115 v, 40-60 cps	115 v, 40-60 cps	115 v, 40-60 cps	115 v, 40-60 cps
POWER CONSUMPTION	16 w	16 w	16 w	12 w
DIMENSIONS				
Height	5-3/4 in	5-3/4 in	5-3/4 in	5-3/4 in
Width	5 in	5 in	5 in	5 in
Depth	6-1/4 in	6-1/4 in	6-1/4 in	6-1/4 in
WEIGHT	4-1/2 lb	4-1/2 lb	4-1/2 lb	2-3/4 lb

TYPES 1214-A, -D, -E, AND -M UNIT OSCILLATORS

1 PURPOSE. The Type 1214 Unit Oscillators (Figure 1) are compact, low-distortion signal sources intended primarily for use with companion General Radio instruments, but useful also as general-purpose laboratory oscillators. These Unit Oscillators cover the following frequencies:

Type	Frequency
1214-A	400, 1000 cps
1214-D	120 cps
1214-E	270, 1000 cps
1214-M	1 Mc

2 DESCRIPTION.

2.1 CIRCUIT. The Type 1214 Unit Oscillator includes a built-in transformerless power supply, which operates from 115 volts, 40 to 60 cps. (Direct current may be used, but performance may not be within specifications.) The oscillator is a Hartley circuit, with the coil tapped for 1000-cps operation in the -A and -E models. The output circuit is coupled through an isolating pickup coil, and can be operated either grounded or ungrounded.

2.2 CONTROLS. Power is applied by means of an OFF-ON toggle switch on the panel. Other panel controls include a frequency selector toggle switch on the -A and -E models, plus the following:

Name	Model	Type	Function
Output Control	A, E, M	Continuous rotary control	Varies output power from zero to maximum.
SET TO BRIDGE MULTIPLIER	D	4-pos selector switch	Matches output to various bridge loads.
Δf	M	Continuous rotary control	Varies frequency ±1% from 1 Mc.

2.3 CONNECTORS. The output terminals of the Type 1214 Unit Oscillator are jack-top binding posts with 3/4-inch spacing. A link and separate ground binding post below the output pair permit grounded or ungrounded operation of the oscillator.

On the Type 1214-D, the EXT OSC panel jack permits use of the Type 1214-D's matching transformer with an external audio oscillator.

3 OPERATING PROCEDURE.

3.1 TYPES 1214-A AND 1214-E. Connect the device to be driven to the output binding posts. Connect the link between the lower two binding posts if grounded output is desired. Connect the Unit Oscillator to a 115-volt, 40-60-cps source, set the OUTPUT FREQUENCY switch to the desired frequency, and snap the power switch ON. The panel lamp should light to indicate application of power.

By means of the output control in the center of the panel, output power may be varied from zero to a maximum of 200 mw into an 8000-ohm load for the Type 1214-A, 300 mw into an 800-ohm load for the Type 1214-E.

3.2 TYPE 1214-D. When the Type 1214-D Unit Oscillator is used with the Type 1611-B Capacitance Test Bridge, the Unit Oscillator output terminals should be connected to the EXT GEN terminals of the bridge. Connect the third binding post of the oscillator to an external ground, preferably at the same point at which the bridge is grounded. For grounded output, connect the link between the lower two binding posts. Set the SET TO BRIDGE MULTIPLIER switch to the position corresponding to the setting of the bridge MULTIPLY CAPACITANCE BY switch. Connect the Unit Oscillator to a 115-volt, 40-60-cps source, and snap the power switch ON. The panel lamp should light to indicate application of power.

If an external audio oscillator is to be used with the Type 1214-D's matching transformer, connect the external oscillator to the EXT OSC jack, and connect the Type 1214-D output to the bridge EXT GEN connector. Set the bridge filter switch to EXT and connect an external filter to the bridge EXT FILTER jack.

Under normal operation, the output voltages delivered to the Type 1611-B bridge are as follows:

Multiplier	Capacitance	Volts	Multiplier	Capacitance	Volts
X 1	1	37	X 100	100	4.8
	10	31		1000	4.8
X 10	10	16	X 1000	1000	1.6
	100	15		10,000	1.6

3.3 TYPE 1214-M. Connect the device to be driven to the output of the Type 1214-M, using either the side multipoint connector (see Figure 12 for proper connections) or the panel jack-top binding posts. For grounded output, connect the link between the lower two binding posts. Connect the Unit Oscillator to a 115-volt, 40-60-cps source, and snap the power switch ON. The panel lamp should light to indicate application of power.

By means of the output control in the center of the panel, output power can be varied from zero to 300 milliwatts into a 50-ohm load. To compensate for frequency shift with changing load conditions, or to match the output frequency to the frequency of an external filter or other tuned device, the Δf control will vary the output frequency $\pm 1\%$ from 1 Mc.

4 SERVICE AND MAINTENANCE.

4.1 GENERAL. The following information should enable the user to locate and correct ordinary troubles resulting from normal use. Major difficulties should be referred to our Service Department, which will cooperate as much as possible by furnishing instructions as well as by supplying any replacement parts needed. When writing our Service Department, please mention the serial and type numbers of the instrument. Also include a report of the trouble encountered, and any steps taken to eliminate the difficulty.

Before returning an instrument or part for repair, please write to our Service Department, requesting a Returned Material Tag, which includes shipping instructions. Use of this tag will insure proper handling and identification. A purchase order covering repair of material returned should also be forwarded to avoid unnecessary delay.

4.2 REMOVAL OF COVER. To remove the cover, loosen the thumbscrew on the right-hand side of the instrument and slide the cover off, away from the panel. With the cover off, tubes and fuses are accessible.

4.3 TEST VOLTAGES AND RESISTANCES. The following test voltages and resistances are given to aid in trouble-shooting. Due to the direct connection to the power line, the oscillator and power-supply circuits are not grounded to the chassis. Voltage measurements are therefore referred to pin 2 of the Type 117N7GT tube. D-C voltages were measured with a 20,000-ohm/volt meter. Resistance measurements were made with pin 8 connected to pin 2, and with power off.

TABLE OF VOLTAGES

V1, PIN	VOLTS TO PIN 2			
	1214-A	1214-D	1214-E	1214-M
1	0	0	0	0
2	0	0	0	0
3	112	94	120	112
4	-10	-45	-13	-43
5	92	96	94	112
6	0	0	0	0
7	115 ac	115 ac	115 ac	115 v ac
8	123	109	120	116

TABLE OF RESISTANCES

V1, PIN	RESISTANCE TO GROUND (in ohms)			
	1214-A	1214-D	1214-E	1214-M
1	∞	∞	∞	∞
2	0	0	0	0
3	330	350	320	300
4	1 M	1 M	1 M	300 k
5	4.7 k	295	8.5 k	300
6	0	0	0	0
7	180	180	180	180
8	0	0	0	0

NOTE: For conditions of measurement, refer to paragraph 4.3.

PARTS LIST

				PART NO. (NOTE A)	MODEL(S)
RESISTORS (NOTE B)	R1	THYRITE		REU-8	A, D, E
	R1	250	±10%	POSC-12	M
	R2	510 k	±5% 1/2 w	REC-20BF	A, D, E
	R2	300 k	±5% 1/2 w	REC-20BF	M
	R3	75	±10% 1/2 w	REW-3C	M
	R4	4.3 k	±5% 1/2 w	REC-20BF	A
	R4	8.2 k	±5% 1/2 w	REC-20BF	E
	R4	100	±5% 1/2 w	REC-20BF	M
	R5	1 M	±10% 1/2 w	REC-20BF	A, D, E
	R5	100 k	±10% 1/2 w	REC-20BF	M
	R6	10 k	±5%	214-C	A
	R6	2.5 k	±10%	POSC-7	E
	R6	100	±5% 1/2 w	REC-20BF	M
	R7	75	±10% 1/2 w	REW-3C	A, D, E
	R8	100 k	±10% 1/2 w	REC-20BF	A, D, E
	R9	100	±5% 1/2 w	REC-20BF	A, D, E
	R10	470	±10% 1/2 w	REC-20BF	A, D, E
	R11	100	±5% 1/2 w	REC-20BF	A, D, E
CAPACITORS (NOTE C)	C1	0.5	±10% 600 dcwv	COL-72	D
	C1A	0.27 or 0.33 (NOTE D)	±5% 400 dcwv	1214-E-40	A, E
	C1A	30	300 dcwv	Part of COE-52	M
	C1A	0.068	±10% 400 dcwv	1214-E-40	D
	C1B	(NOTE E)	400 dcwv	1214-E-40 or COL-71	A, D, E
	C1B	30	300 dcwv	Part of COE-52	M
	C1C	90	300 dcwv	Part of COE-52	M
	C2	0.01	±10% 300 dcwv	COM-35B	A, E
	C2	0.047	±10% 400 dcwv	COW-25	D
	C2	35 μμf	±10% 500 dcwv	COM-20B	M
	C3	30	300 dcwv	Part of COE-52	A, E
	C3	130 μμf	±10% 500 dcwv	COM-20B	M
	C3A	30			
	C3B	30	300 dcwv	COE-52	D
	C3C	90			
	C4	30	300 dcwv	Part of COE-52	A, E
	C4	4-50 μμf		COA-2	M
	C5	90	300 dcwv	Part of COE-52	A, E
	C6	0.001	1000 dcwv	COC-61	M
	C7	0.001	1000 dcwv	COC-61	M
	C8	0.001	1000 dcwv	COC-61	M
	C9	0.001	1000 dcwv	COC-61	M

		PART NO. (NOTE A)	MODEL(S)
F1	0.4 amp Slo-Blo Type 3AG	FUF-1	A, D, E
F1	0.5 amp Slo-Blo Type 3AG	FUF-1	M
F2	0.4 amp Slo-Blo Type 3AG	FUF-1	A, D, E
F2	0.5 amp Slo-Blo Type 3AG	FUF-1	M
L1	INDUCTOR	1330-203-2	M
L2	INDUCTOR		
L3	CHOKE, 2.2 mh, Waters Type C1059	CHA-55	M
L4	CHOKE, 2.2 mh, Waters Type C1059	CHA-55	M
P1	PILOT LAMP, 115 v	NE-51	All
S1	SWITCH, dpst	SWT-333	All
S2	SWITCH, dpdt	SWT-335	A, E
S2	SWITCH, Rotary	SWRW-178	D
T1	TRANSFORMER	345-455-2	A
T1	TRANSFORMER	345-467	D
T1	TRANSFORMER	345-473	E
T2	TRANSFORMER	746-428	D
V1	TUBE	117N7-GT	All

NOTES

(A) Type designations for resistors and capacitors are as follows:

COA - Capacitor, air
COC - Capacitor, ceramic
COE - Capacitor, electrolytic
COL - Capacitor, oil
COM - Capacitor, mica
POSC - Potentiometer, composition
REC - Resistor, composition
REU - Resistor, unclassified
REW - Resistor, wire-wound

(B) All resistances are in ohms except as otherwise indicated by k (kilohms) or M (megohms).

(C) All capacitances are in microfarads, except as otherwise indicated by μμf (micromicrofarads).

(D) Value determined at General Radio laboratory.

(E) Value and type determined at General Radio laboratory.

When ordering replacement components, be sure to include complete description as well as Part Number. (Example: R85, 51 k ±10%, 1/2 w, REC-20BF.)

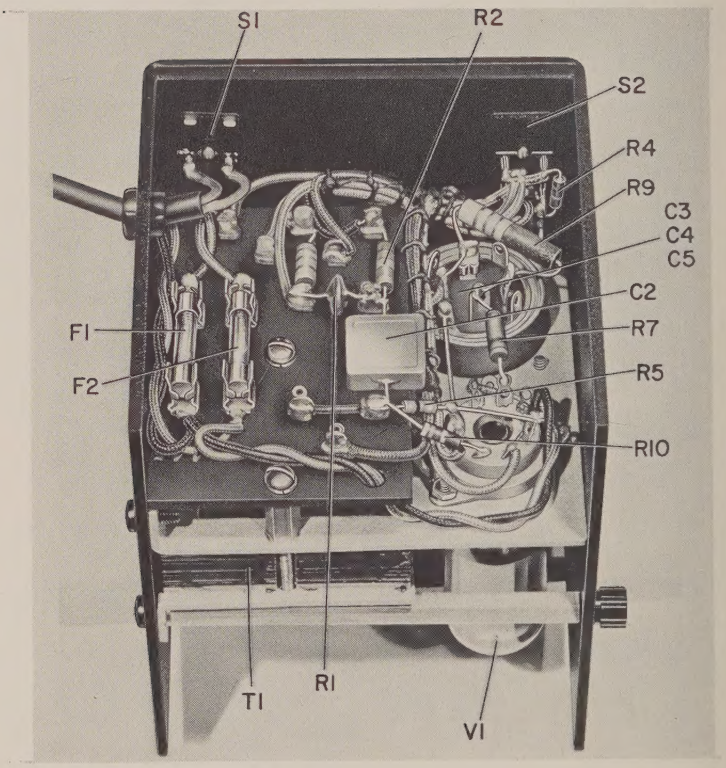


Figure 2. Interior View, Type 1214-A Unit Oscillator.

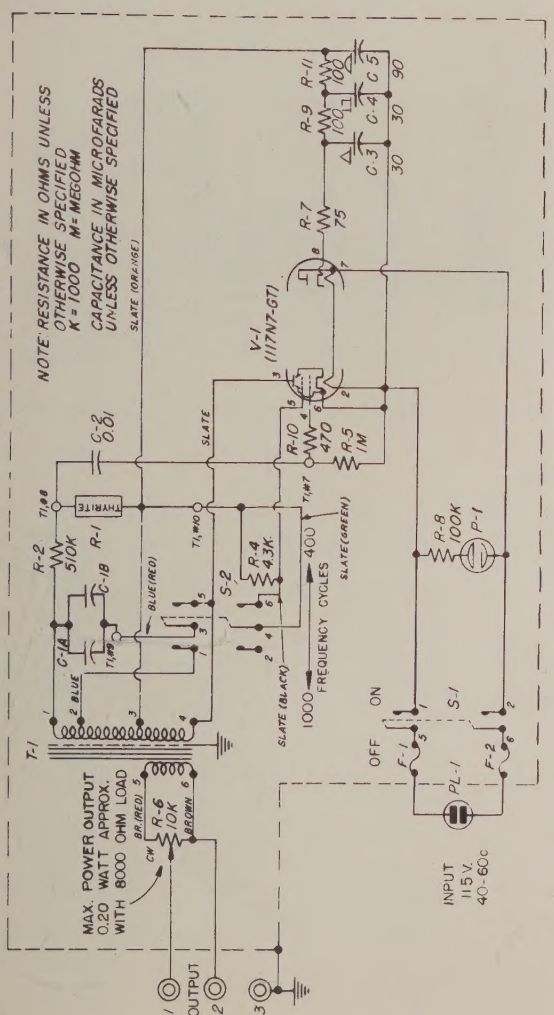


Figure 3. Schematic Diagram, Type 1214-A Unit Oscillator.

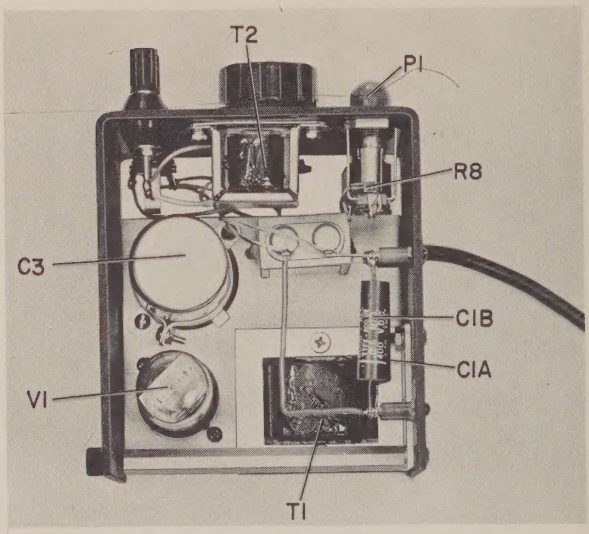


Figure 4. Top Interior View, Type 1214-D Unit Oscillator.

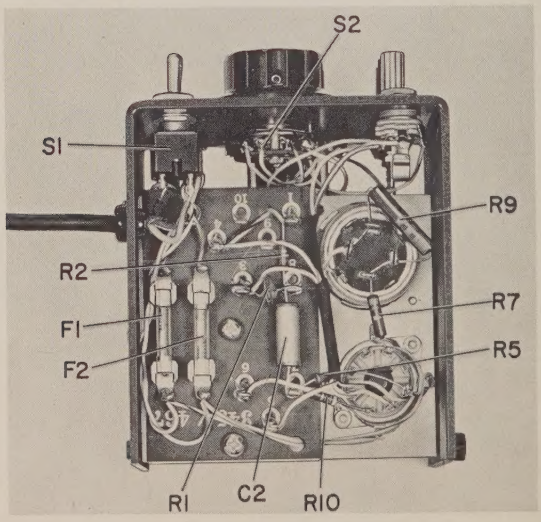


Figure 5. Bottom Interior View, Type 1214-D Unit Oscillator.

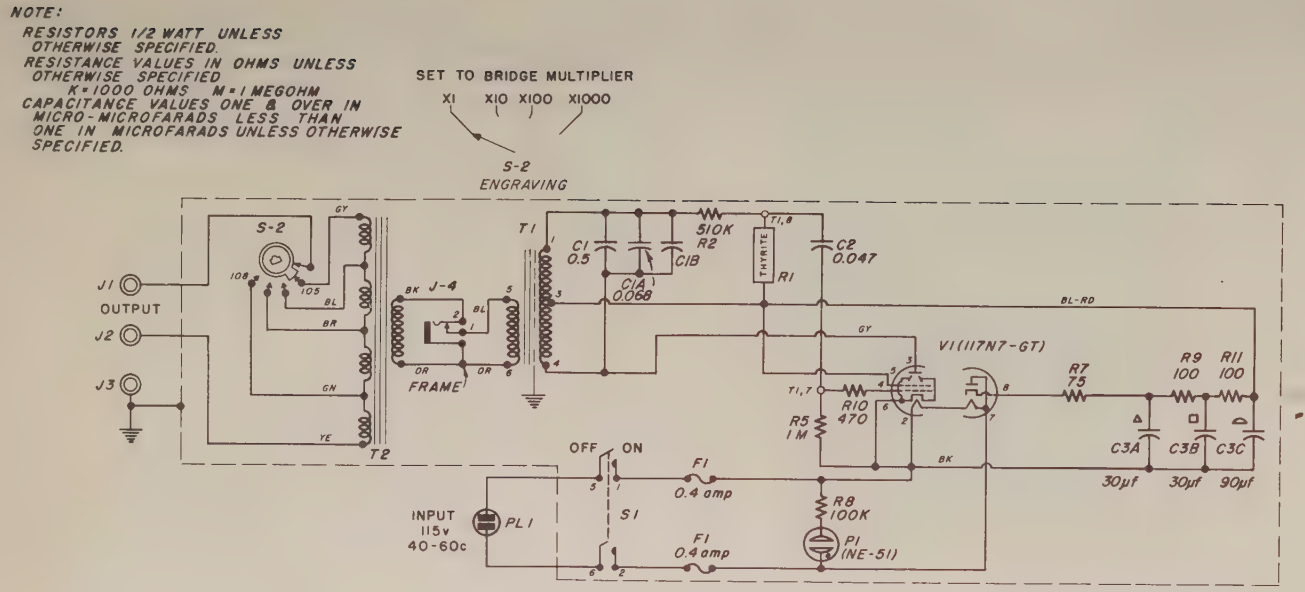


Figure 6. Schematic Diagram, Type 1214-D Unit Oscillator.

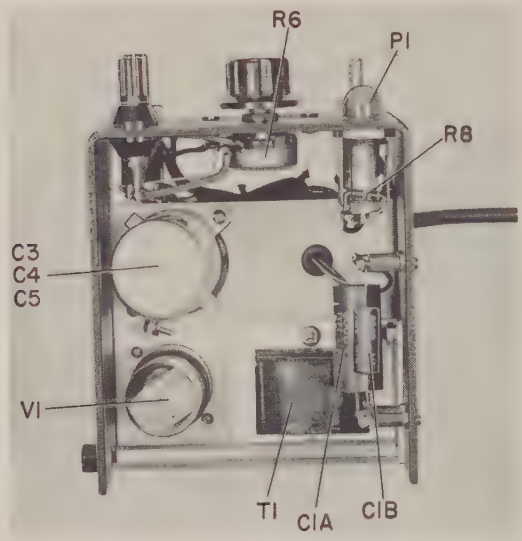


Figure 7. Top Interior View, Type 1214-E Unit Oscillator.

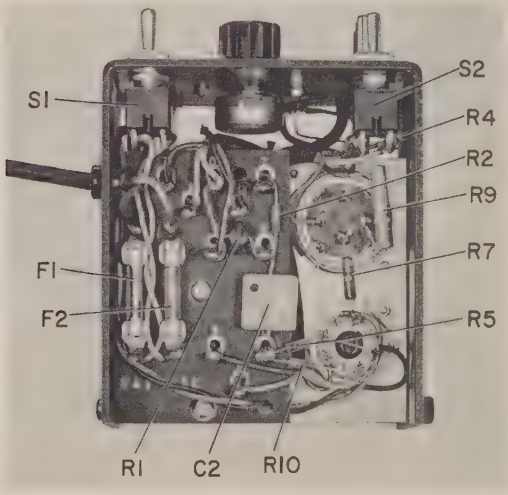


Figure 8. Bottom Interior View, Type 1214-E Unit Oscillator.

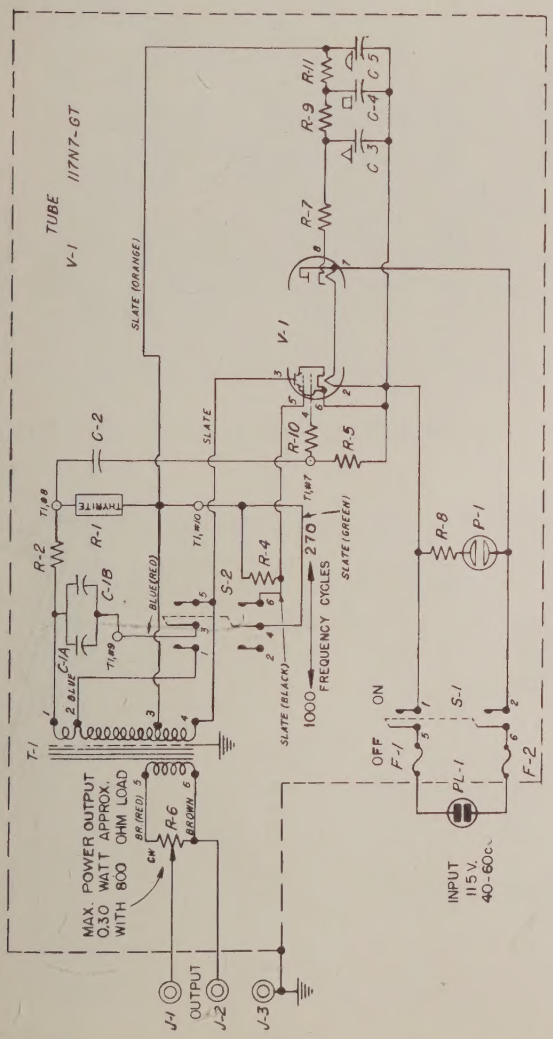


Figure 9. Schematic Diagram, Type 1214-E Unit Oscillator.

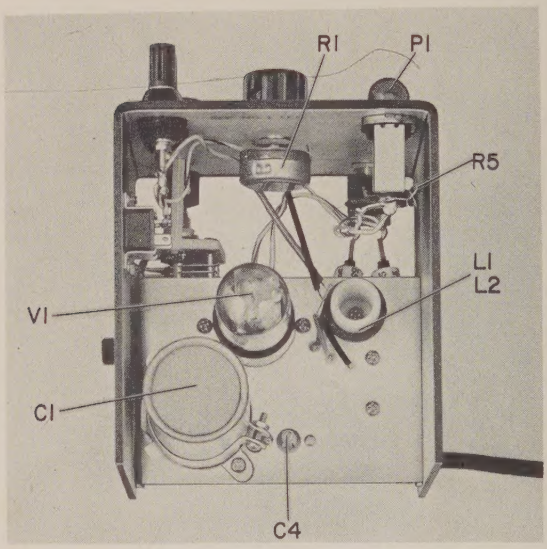


Figure 10. Top Interior View, Type 1214-M Unit Oscillator.

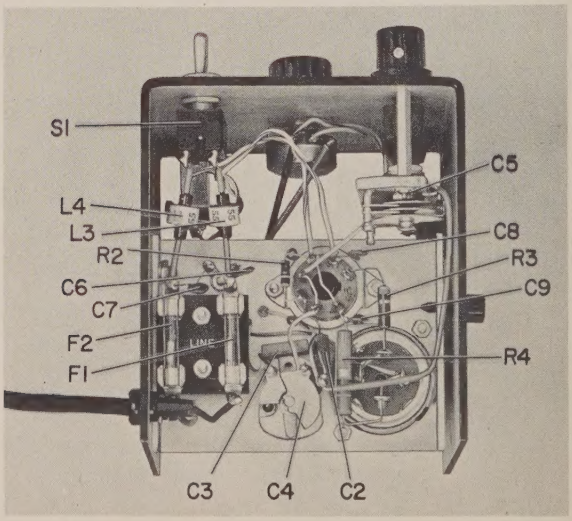


Figure 11. Bottom Interior View, Type 1214-M Unit Oscillator.

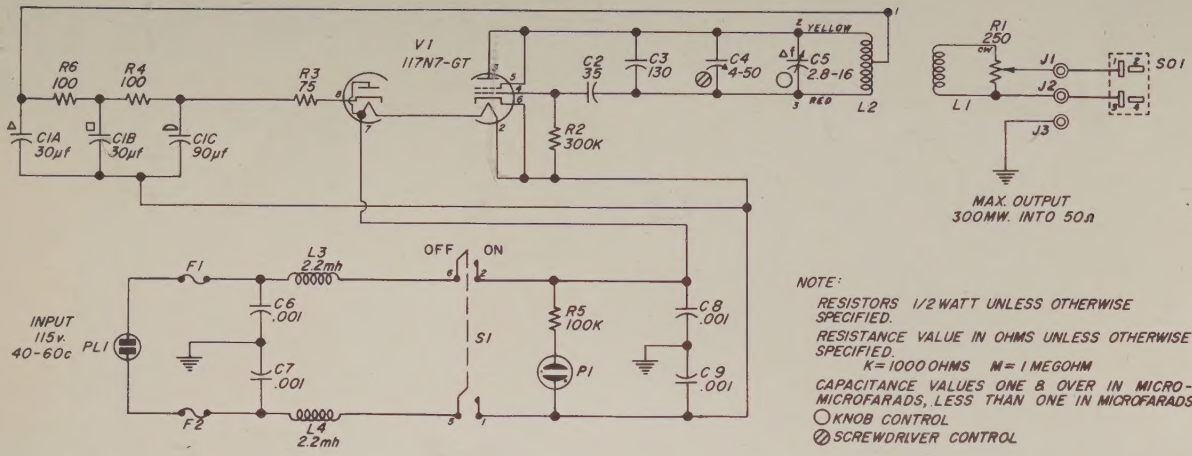


Figure 12. Schematic Diagram, Type 1214-M Unit Oscillator.

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